

What is claimed is:

1. A method of protecting inert anode assemblies from thermal shock during operation in a metal producing cell comprising:

(1) operating an electrolysis cell having a plurality of inert anode assemblies at over 850°C in a molten cryolite bath, where all of the anode assemblies are shielded by a circumscribed heat radiation shield;

(2) withdrawing a shielded anode assembly adjacent to other shielded assemblies thus exposing the other assemblies to lower ambient temperatures; and

(3) inserting a new shielded anode assembly adjacent the other shielded anode assemblies;

wherein the radiation shield does not disintegrate in contact with cryolite fumes, remains intact in place above the molten bath, and prevents a temperature drop within its circumscribed assembly of under about 30°C.

2. The method of Claim 1, wherein the heat radiation shield is from about 0.2 cm to 4.0 cm thick and comprises alumina and a material selected from the group consisting of silica, calcia, and mixtures thereof, wherein the alumina content is from 50 wt% to 95 wt%.

3. The method of Claim 1, wherein the anode assembly is withdrawn from the cell and a new shielded replacement assembly is installed in less than 60 seconds.

4. The method of Claim 1, wherein the radiation shield prevents a temperature drop within its circumscribed assembly of under about 20°C.

5. The method of Claim 1, wherein a new shielded assembly is installed in from 10 seconds to 50 seconds.

6. The method of Claim 2, wherein the alumina content is from 60 wt% to 85 wt% and the porosity of the shield is from 5 vol% to 30 vol%.

7. A method of replacing anode assemblies which are immersed in a bath comprising molten electrolyte in an aluminum electrolysis cell comprising:

(1) operating an aluminum electrolysis cell at a temperature over about 850°C, where a plurality of adjacent anode assemblies are immersed in molten electrolyte, said assemblies being subject to deterioration by at least the electrode and also operating as a heat sink while in the molten electrolyte, where all of the anode assembly comprises an inert shielded anode having an attached, heat radiation shield and act as a radiation shield;

(2) removing at least one anode assembly adjacent another shielded assembly by drawing it out of the molten electrolyte, thus exposing the remaining adjacent shielded anodes to lower radiative external ambient temperatures, wherein the heat radiation shield reduces cooling of the shielded inert anode assembly over about 30°C; and

(3) replacing the removed anode assembly with another anode assembly, wherein the heat radiation shield remains intact and in place above the molten electrolyte bath.

8. The method of Claim 7, wherein the heat radiation shield is from about 0.2 cm to 4.0 cm thick and consists essentially of alumina and a material selected from the group consisting of alumina, silica, calcia and mixtures thereof, wherein the alumina content is from 50 wt% to 90 wt%.

9. The method of Claim 7, wherein the anode assembly is withdrawn from the cell and a new shielded replacement assembly is installed in less than 60 seconds.

10. The method of Claim 7, wherein the shield reduces radiative cooling over about 20°C.

11. The method of Claim 7, wherein the anode assembly is withdrawn from the cell and a new shielded assembly is installed in from 10 seconds to 50 seconds.

12. The method of Claim 7, wherein the molten bath comprises cryolite, where alumina content is from 60 wt% to 80 wt% and the porosity of the shield is from 5 vol% to 30 vol%.